

WHAT IS CLAIMED IS:

1. A thin film forming method, comprising the steps of:
  - employing a surface of a substrate as one electrode and disposing the surface of the substrate in a distance d (cm) apart from another electrode in a discharge space in which there are positioned at least a pair of electrodes connected to an RF power source;
  - introducing a gas containing one or more silicon compounds and hydrogen into the discharge space;
  - setting the product Pd of a film forming pressure P (Pa) and d and hydrogen flow rate M (SLM) so as to meet the relation:
$$80M + 200 \leq Pd \leq 160M + 333; \text{ and}$$
  - applying RF power to generate a plasma and to form a non-monocrystal silicon thin film on the substrate in the discharge space.
2. The thin film forming method as set forth in Claim 1, wherein said product Pd and flow rate L (SLM) of a gas mixture comprising said gas containing one or more silicon compounds and hydrogen are set so as to meet the relation:
$$67L + 200 \leq Pd \leq 147L + 333.$$
3. The thin film forming method as set forth in Claim 1, wherein said distance d lies in a range of 0.5

to 3 cm.

4. The thin film forming method as set forth in  
Claim 1, wherein said hydrogen flow rate M ranges from  
5 500 sccm to 10000 sccm.

5. The thin film forming method as set forth in  
Claim 1, wherein a flow rate of said gas containing one  
or more of said silicon compounds ranges from 10 sccm  
10 to 1000 sccm.

6. A thin film forming method, comprising the  
steps of:

employing a surface of a substrate as one  
15 electrode and disposing the surface of the substrate in  
a distance d (cm) apart from another electrode in a  
discharge space in which there are positioned at least  
a pair of electrodes connected to an RF power source;

introducing a gas containing one or more silicon  
20 compounds and hydrogen into the discharge space;

setting the product Pd of a film forming pressure  
P (Pa) and d and the ratio M/V of hydrogen flow rate M  
(SLM) to volume V (cm<sup>3</sup>) of the discharge space so as to  
meet the relation:

25  $4 \times 10^5 dM/V + 200 \leq Pd \leq 8 \times 10^5 dM/V + 333$ ; and  
applying RF power to generate a plasma and to form  
a non-monocrystal silicon thin film on the substrate in

the discharge space.

7. The thin film forming method as set forth in  
Claim 6, wherein said product Pd and flow rate L (SLM)  
5 of a gas mixture comprising said gas containing one or  
more silicon compounds and hydrogen divided by said  
volume V ( $\text{cm}^3$ ) are set so as to meet the relation:

$$3.3 \times 10^5 \frac{\text{dL}}{\text{V}} + 200 \leq \text{Pd} \leq 7.3 \times 10^5 \frac{\text{dL}}{\text{V}} + 333.$$

10 8. The thin film forming method as set forth in  
Claim 6, wherein said distance d lies in a range of 0.5  
to 3 cm.

15 9. The thin film forming method as set forth in  
Claim 6, wherein said hydrogen flow rate M ranges from  
500 sccm to 10000 sccm.

10. The thin film forming method as set forth in  
Claim 6, wherein a flow rate of said gas containing one  
20 or more of said silicon compounds ranges from 10 sccm  
to 1000 sccm.